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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XII NUMBER 3 MARCH 1982

SILVER PREFERRED IN MAKING WATER FOUNTAINS

The preferred brazing alloys in the water cooling and refrigerating industries contain silver. Silver is a marvelous metal to work with. Its alloys are free flowing and readily wet the surfaces of all ferrous and non-ferrous metals except magnesium. Brazing, the metal joining technique that is stronger than soldering, but does not require the energy input nor the equipment of welding, is the preferred technique for small assemblies. **A silver braze is preferred where potable water is involved, for silver never degrades water quality even when there is long-standing contact with the water.** Furthermore, its low brazing temperature, high corrosion protection, and significant strength all contribute to a metal-to-metal bond of high integrity and reliability.

The **EBCO Manufacturing Company,** 265 North Hamilton Road, Columbus, Ohio 43213, depends upon silver brazing alloys to provide this reliability to its Oasis Water Coolers *pictured at right.* Water coolers, the indispensable convenience in the modern office building, school, or factory, require leak-free operation throughout their useful life. The pipe joints of refrigeration units are especially susceptible to expansion and contraction forces that exert stress on the metal-to-metal joints. Silver alloys of 25% silver, 41% copper, 32% zinc, 2% tin, provide the strength to overcome these stresses and ensure the integrity of the joints between the copper and steel piping in the refrigeration circuit. Silver brazes of lower silver content are used for those circuits that carry only room-temperature water.

Silver brazes are specified by leading refrigeration equipment manufacturers, such as, the Queen Products Division, **King-Seeley Thermos Company,** 505 Front St., Albert Lea, Minnesota 56007, which manufactures ice makers; and the **Manitowoc Company, Inc.,** Manitowoc, Wisconsin 54220, which manufactures ice-making evaporators.

INCREASING USES OF SILVER BRAZING

Wherever metal-to-metal bonds are required that come in contact with different kinds of food, silver brazes are the preferred joining material. The beaters for portable mixers manufactured by **The General Electric Company,** 1285 Boston Ave., Bridgeport, Connecticut 06602, and the paddles in the food mixers manufactured by the Hamilton-Beach Division, **Scoville Manufacturing Company,** P.O. Box 1158, Washington, N.C. 27889, require the use of silver brazes. U.S. consumption of pure silver in brazing alloys rose from 8,508,000 troy ounces in 1980, to 9,699,000 troy ounces in 1981. The consumption of pure silver in brazing alloys by one food mixer manufacturer alone was in excess of 10,000 troy ounces last year.

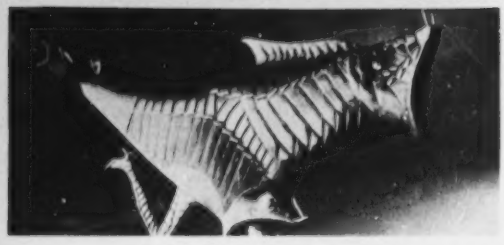
Silver brazing finds application in a wide variety of fields. The joining of electrical bus bars, joining of electrical cable to terminals, attaching contact tips to electrical conductors, and the joining of heating or cooling elements to terminal connections are typical examples. For piping, joints between dissimilar metals, joints for heat exchangers, joints where thin-walled pipe is required, or joints where high strength is required, like automobile radiators where the joint is not only a requirement for sealant integrity, but acts as a structural support for the radiator; silver brazing alloys are indispensable. Silver brazing also offers an alternative to expensive machining, forging, or casting. Large silver brazed parts, such as aircraft aluminum alloy sheet silver brazed assemblies, brazing together of titanium plates for aircraft wing and fuselage bulkheads, protective plates for the leading edges of vanes in steam turbines, and the attachment of carbide tips to machine tools, are among the many advances in brazing reported in **New Silver Technology** since 1974.

Silver brazing technology is under constant development by the major suppliers of silver alloys. Although their primary concern is the production of the alloys themselves, which range in composition from 1% to 95% silver, and have melting points in the low melting range of 1175° to 1780°F (635° to 970°C), information and consultation on individual problems are provided by such suppliers as **Degussa GmbH,** Metal Joining Techniques Division, D 6450 Hanau 1, Postfach 602 West Germany, or 3370 South Service Road, Burlington, Ontario, Canada L7N 3M6; the **Engelhard Corporation,** Route #152, Plainville, Massachusetts 02762, or St. Nicholas House, St. Nicholas Road, Sutton, Surry SM1 1EN, England; **J.W. Harris Company, Inc.,** Harris Soldering and Brazing Products, 10930 Deerfield Road, Cincinnati, Ohio 45242; **Handy & Harman,** 850 Third Ave., New York, N.Y. 10022; and the **United Wire & Supply Corp.,** 1497 Elmwood Ave., Cranston, R.I. 02910.

TANE OF MEXICO PROMOTES ARTISTIC USE OF SILVER

Long known for its very fine, very beautiful and traditional sterling silver tea services, pitchers, trays and other decorative and useful items such as those pictured below, **TANE,** Campos Eliseos 65-B, Polanco, Mexico 5, D.F., Mexico, is also known for its promotion of artistic work in silver.

Since 1974, TANE has been inviting renowned artists of Mexico and other countries to design individual works in silver that have been executed by its craftsmen in limited editions of ten, eleven, or twelve pieces each, all of them signed and numbered. In each case, two additional copies have been made that are not for sale, one of them for the artist and one for TANE's permanent collection.



According to María Teresa Pría Olavarrieta of TANE, "The dimensions of these works have changed the traditional concept of sculpture as an art of cultural objects whose size and situation allow them to be appreciated only at a distance, replacing it with that of the tactile sculpture—works in pure silver that can fit easily into one's own familiar surroundings, providing daily contact with the art." *Seen at left is a fantasy figure called "Benda,"* created in pure silver, by Mexican artist and sculptor, Francisco Toledo. This, and many other of TANE's "Art/Objects" have been exhibited at Mexico's Museum of Modern Art of the National Institute of Fine Arts, and have enjoyed widespread popularity among the world's collectors of modern art.

NEW SILVER TECHNOLOGY, A TRULY INTERNATIONAL JOURNAL

Since its first issue in January 1974, the Silver Institute's quarterly, **New Silver Technology,** has carried reports on new developments in silver technology from many parts of the world. Just in 1981 alone, this journal published readable summaries of work done in 28 nations, including Australia, Austria, Belgium, Canada, China, Denmark, England, Finland, France, German Democratic Republic, German Federal Republic, Hong Kong, India, Israel, Italy, Japan, Libya, Netherlands, Poland, South Africa, Soviet Union, Spain, Sweden, Switzerland, Taiwan, United States, Yugoslavia and Zimbabwe.

New Silver Technology's readership has also expanded to paid subscribers in Australia, Austria, Bulgaria, China, Belgium, Canada, Colombia, Denmark, England, Ethiopia, France, Germany, India, Ireland, Israel, Italy, Japan, Kenya, Mexico, Morocco, Spain, South Africa, Switzerland, Sweden, Uganda, U.S.S.R. and the United States, recognizing **New Silver Technology** as an international journal, both in coverage and readership.

NEW RESEARCH IMPROVES THE SUPERIORITY OF SILVER DENTAL ALLOYS

In the United States alone, dental alloys consume in excess of 2,000,000 troy ounces of pure silver annually. There seems little reason for this figure to decrease because no other metal provides the convenience of amalgamation and curing in the tooth coupled with unequaled antiseptic effect as that assured by silver and its alloys in this most rigorous environment. Currently, research is being done on silver dental alloys in the United States, Japan, the Federal Republic of Germany, South Africa, Canada, and the Netherlands, especially on a new class of silver-tin alloys; those with

increased proportions of copper, as reported in **New Silver Technology.**

The discovery that silver-tin dental alloys with 20% to 30% copper content (traditional dental alloys contain about 5% copper) provide superior corrosion resistance, creep resistance, compressive strength, and durability occurred about a decade ago. This discovery has stimulated considerable research into the best realization of these alloys. The latest development is being reported in the current April 1982 issue of **New Silver Technology.** T.P. Pokorni and D.E. Balzaretti, Macrodent S.A., Heredia 665, 1427 Buenos Aires, Argentina, have patented a dental composition consisting of tiny atomized spherical particles of 46.5% silver, 24.5% copper, and 29% tin alloy, mixed with slightly larger finely ground, angular particles of 43.5% silver, 23.5% copper, and 33% tin alloy. This combination of different shape particles, when mixed with mercury, **forms a dental amalgam which resists damage from chewing soon after the prepared tooth is filled.**

These new dental alloys fall into two general classes: those like that above that are supplied with differing particle shapes of essentially the same composition; and those with differing particle shapes, but with each shape having a different alloy composition. For the second type, only when the mercury is added does the resulting amalgam form the desired composition mixture. An example of the latter type is that patented by Joseph Aliotta and L.F. Alcuri, Engelhard Corp., Iselin, N.J. 08830. As reported in **New Silver Technology,** July 1981, page 11, three different silver alloy compositions are prepared in spherical, irregular, and flake shaped particles. This combination when amalgamated provides the dentist with superior working characteristics.

NEW MEMBER WELCOMED

The Silver Institute welcomes to membership, **Ranchers Exploration and Development Corporation,** 1776 Montano Road, Albuquerque, New Mexico 87197 with its Senior Vice President, Treasurer, Mr. M. K. Kaiser, serving as its Official Representative in the Institute.

DUTCH COIN MARKS 200 YEARS OF FRIENDSHIP WITH U.S.

The Dutch Mint recently announced that it will strike a sterling silver "Friendship Coin" commemorating the bicentennial of continuously harmonious relations between the Netherlands and the United States.

The coin, shown at right, was designed by renowned Dutch sculptor and medalist, Eric Claus, who chose the symbols of the Netherlands and the United States, the lion and the eagle respectively, as subjects for the coin's reverse design. His design conveys the significance of the long lasting bond of friendship between the two countries, as well as "both nations' love for freedom and peace on earth." Struck in .925 (*sterling*) silver, this Friendship Coin is the first 50 guilder coin issued in the Netherlands. **The new coin, which weighs 25 grams and measures 38 mm in diameter, is legal tender in the Netherlands and is available in Proof and Bright Uncirculated condition.**

April 19, 1982, marks the 200th anniversary of the establishment of diplomatic relations between the United States and the Netherlands. On that date in 1782, John Adams, later to become President of the U.S., was admitted as Minister Plenipotentiary (diplomatic representative) of the fledgling American republic to the then two centuries old Dutch Republic.

From April 19 until October 19, 1982, the United States and the Netherlands will jointly commemorate this historic bicentennial. The Friendship Coin will be made available to collectors in the United States in conjunction with a visit by Netherland's Queen Beatrix in April. The Friendship Coin, which bears a dignified portrait of the monarch (as pictured above) on its obverse, is among the first coinage struck to bear the likeness of the new Queen of the Netherlands.

Although the new Friendship Coin will not become available in North America until mid-April, advance orders may be sent to the Dutch mint's North American agency. For more information, write to 'S Rijks Munt, Leidsweg 90, 3531 BG Utrecht, Netherlands or to the Dutch Mint, Post Office Box 714, West Caldwell, New Jersey 07006.

REFINERS' STOCKS OF 999 SILVER ARE SMALL

World producers of the 999 refined silver used as the starting material for making the hundreds of products essential in our daily lives, carry out their operations with very small inventories. As will be seen from the figures below, both the U.S. and Non-U.S. refining totals show that for both groups the totals of refined silver in the hands of the refiners are equivalent to less than 10 days of refined production.

It will also be seen that the number of ounces of refined silver produced for all the uses has continued to decrease. U.S. production for the first two months of 1982 was 30% less than in the first two months of 1981; and in the other countries refined silver production was 6% less in January and February 1982 as compared with January and February 1981.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES			
	February 1982	Feb 1982	Jan 1982	Jan-Feb 1982	Jan-Feb 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*			
From Primary (ores & concentrates)	3,573,453	3.6	3.9	3.7	3.7	3.7
From Coins	0	0.0	0.0	0.0	0.4	0.1
From Old Scrap (used photo film & other products)	3,479,949	3.5	3.7	3.6	5.6	4.7
From New Scrap (in-plant clippings, waste)*	1,353,769	1.4	1.4	1.4	2.7	2.3
TOTAL PRODUCTION	8,407,171	8.4	9.0	8.7	12.4	10.9
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	2,289,425	2.3	2.4	2.3	4.1	3.4
Shipped Out as 999 Silver	5,250,947	5.3	6.1	5.7	7.7	7.5
TOTAL DISPOSITION	7,540,372	7.5	8.5	8.0	11.8	10.9
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*			
STOCKS (Production Minus Disposition)	+866,799	+0.9	+0.6	+1.4	+1.3	−0.0+
THESE REFINERS' STOCKS AT END OF PERIOD	2,544,857	2.5	1.7	2.5	2.4	1.1

Production and Disposition of **999 Silver** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES			
	February 1982	Feb 1982	Jan 1982	Jan-Feb 1982	Jan-Feb #1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*			
From Primary (ores & concentrates)	12,121,625	12.1	12.8	12.5	12.4	12.7
From Coins	0	0.0	0.0	0.0	0.2	0.1
From Old Scrap (used photo film & other products)	5,169,820	5.2	4.2	4.7	6.2	5.7
From New Scrap (in-plant clippings, waste)*	2,094,931	2.1	1.7	1.9	1.3	1.1
TOTAL PRODUCTION	19,386,376	19.4	18.6	19.0	20.2	19.6
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,674,476	3.7	3.3	3.5	5.5	4.8
Shipped Out as 999 Silver	15,254,160	15.3	14.7	15.0	15.5	15.0
TOTAL DISPOSITION	18,928,636	18.9	18.1	18.5	20.9	19.8
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*			
STOCKS (Production Minus Disposition)	+457,740	+0.5	+0.5	+1.0	−1.5	−2.2
THESE REFINERS' STOCKS AT END OF PERIOD	6,398,312	6.4	5.9	6.4	6.1	5.4

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes.

#Revised to include additional participants

THE SILVER INSTITUTE

A WORLDWIDE ASSOCIATION OF MINERS, REFINERS, FABRICATORS AND MANUFACTURERS

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THE SILVER INSTITUTE LETTER

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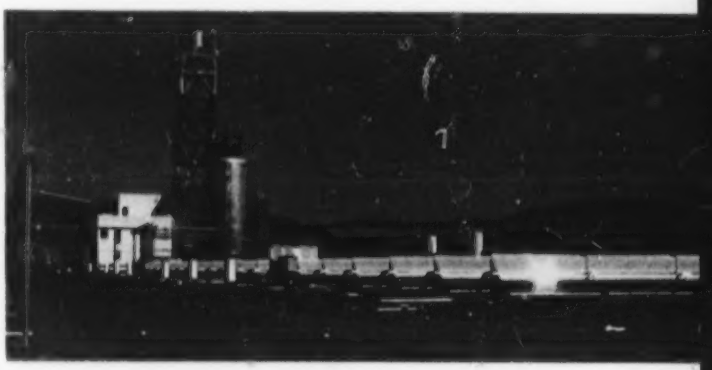
VOLUME XII NUMBER 4 APRIL 1982

SILVER LIGHTS UP THE PLAINS OF SPAIN



The solar thermal-electric power plant on the Almeria plain near Costa del Sol, is now supplying 500 kilowatts of electric power to the local Spanish utility network. The plant is a test bed for three independent systems. The one in the *photograph at right* was constructed by the **Acurex Solar Corporation,** 485 Clyde Avenue, Mountain View, California 94042, and is composed of a series of parabolic trough solar collectors, which by focusing the energy of the sun on a black chrome-plated absorber tube, heats the transfer fluid to 295°C (560°F) which produces the energy to provide steam for the steam generator. The solar collectors seen above are silver-coated thin glass bonded by adhesives to aluminum-coated steel sheet previously formed into the required parabolic shape. **Silver was the clear choice because it has the highest reflectivity over the entire range of the solar spectrum.**

The other two systems also utilize silver backed mirrors for focusing the rays of the sun. The first is a sodium heat-transfer system which uses **Martin Marietta Corporation** heliostats to direct solar energy to a tower-mounted cavity-type receiver which is not yet operational. The other set of parabolic trough solar collectors, which is operational, was manufactured by **Maschinenfabrik Augsburg-Nürnberg (MAN-Neue Technologie),** Federal Republic of Germany.

The Almeria power plant is a $13 million project sponsored by the International Energy Agency in Paris, France, with the cooperation of Austria, Belgium, Federal Republic of Germany, Greece, Italy, Spain, Sweden, Switzerland, United Kingdom, and the United States. This plant is demonstrating the practicality of using solar energy at remote sites where conventional sources of power, such as coal and oil, are not available.

With the help of silver and the sunny climate of this location, it is expected that **this plant will be able to supply electric power 365 days a year, and also serve as a model for the ten other cooperating nations.**

QUEEN MOTHER PORTRAYED ON MOST RECENT FALKLAND ISLAND SILVER COIN

The Falkland Islands, a group of some 200 islands, is located about 300 miles east of Argentina in the South Atlantic Ocean. Although this island group was discovered in 1592 by the British navigator, John Davis, and has been claimed and occupied at various times by Spain, France, Chile, and Argentina, and by England since 1833, it wasn't until 1974 that the Falkland Islands adopted a coinage of its own. In 1977, it issued its first sterling silver coin—a 50 pence coin commemorating the Silver Jubilee of Queen Elizabeth II. Two other 925 fine silver coins showed a Steamer Duck and a Humpback Whale. Its latest sterling coin, *at right,* celebrates the 80th birthday of Queen Elizabeth, Queen Mother.

NEW SILVER BASED INFORMATION SYSTEM

There have been suggestions that silver halide systems might be replaced by magnetic systems, and this has occurred in some applications. Yet, **the world of information processing may be on the verge of entering into an exciting new silver generation,** showing that the reverse is also true. First there were computers utilizing magnetic tapes, then in the 1960s, storage of information on magnetic discs was introduced. Now, vastly greater amounts of information can be stored for a

fraction of the cost of magnetic devices, and for longer periods of time, with **silver based optical memory systems.**

Optical memory devices have been a laboratory dream for almost 10 years, and **Drexler Technology Corporation,** 2557 Charleston Rd., Mountain View, California 94043, has now developed the first medium to satisfy the strict criteria for successful commercial application in information processing; called DREXON, which effectively utilizes many of silver's unique and desirable properties.

DREXON is a thin dielectric organic polymer emulsed with silver grains of filamentary and spherical shapes. It can be instantly encoded by a semiconductor diode laser to form precise microscopic circular holes within a silver reflective surface. DREXON is a "direct-read-after-write" (DRAW) medium. Thus, the data recorded may be read immediately by a low-power semiconductor laser without additional processing, through the absence or presence of holes, as demarcated by the differing intensities of the light reflected by the holes (6%) and the untouched silver reflective surface (40%).

Silver's high reflectivity makes it a most suitable metal for such a process, as this enhances the sensitivity of the medium during reading.

Photo by Victor Budnik

The standard Drexon Laser Card holds nearly 700,000 letters and numbers, and the Drexon Optical Tape Cassette increases storage capacity at much lower costs.

This silver-based system offers numerous advantages over contemporary magnetic memory methods in at least three significant large-scale commercial applications.

The first—for plastic credit cards and identification cards. The black magnetic stripe currently on the reverse of a credit card will store 212 letters and numbers, but a DREXON stripe of the same dimensions would hold nearly 700,000. The new card could store bank accounts and credit lines; it can serve as a running financial statement or passbook for Cash Cards that can be updated as needed without destroying previously recorded information, and could include the fingerprint, signature, photographic image and even voice print of a card-bearer to protect against fraudulent card use.

Amazingly, it would still have room to be a potential life-saver in an emergency by carrying the cardholder's entire medical history; including childhood diseases, allergies, blood type, EKGs, and even miniaturized pictures of critical X-rays. The extraordinary volume of storage is attributable to the high resolution (small holes) attainable with the silver emulsion medium. The DREXON stripe can store data for about one-hundreth the cost of magnetic stripes.

The second commercial market is that of archival storage on optical discs. **Data can be stored for 10 years without expensive maintenance on the silver-based discs, due to silver's persistent resistance to oxidation;** whereas magnetic discs require frequent re-winding and periodic recording. Storing an active file of 250,000 documents requires 1,000 magnetic discs or 260 magnetic tape reels—but only 20 single-sided silver optical discs are needed. Optical discs store information for 3% of the costs of magnetic discs. No wonder that Jerome Drexler, President of Drexler Technology claims, "Optical memory should be an active participant in the widely heralded automated office . . . and in the emergence of the paperless file."

Third, silver-based optical tape will multiply the amount of data provided by a cassette, at lower costs and with less required maintenance.

Silver brings numerous important benefits to the DREXON memory devices. It is the most reflective of all metals, is resistant to oxidation, is non-toxic, permits DREXON to be manufactured from commercially available silver-halide photoplates, and the silver-halide medium permits replication of optically recorded data by photographic contact printing.

SILVER SOLUTION PROTECTS PLANTS AS WELL AS CUT FLOWERS

As reported in past issues of "The Silver Institute Letter," silver nitrate is well established as an effective treatment to preserve the beauty and to prevent premature wilting of cut flowers, such as the pictured carnations. And now, another silver solution—silver thiosulfate—has been found to be equally effective in preventing "shattering" of potted plants according to a study prepared by Arthur C. Cameron,

Michael S. Reid, and Gary W. Hickman, **Department of Environmental Horticulture, University of California at Davis,** Davis, California 95616, and published in the April 1982 issue of the Silver Institute's quarterly journal, **New Silver Technology.**

Shattering occurs when plant parts become separated from the parent plant, as in the dropping of flowers or leaves. Environmental stresses imposed upon flowering plants during packing, transit, and retail display result in undesirable shattering and severe losses for florists if plants are not sold immediately. **But now, commercial flower growers, at an average cost of less than 0.1 cent per plant, are successful in preventing shattering of flowers and petal drop in plants** such as geraniums, calceolaria, bougainvillea, and Christmas Cactus by spraying them with a silver thiosulfate solution prior to shipment. For example, after treatment, geranium plants become densely petalled and much more showy than untreated plants and petal fall is observed *only* on untreated plants.

SILVER ADDS EXCELLENT ANTIBACTERIAL PROPERTIES TO ACRYLIC KNIT FABRICS

The excellent bactericidal properties of silver have now been introduced into acrylic knit fabrics by a new process developed by the **Mitsubishi Rayon Co., Ltd.,** P.O. Box 1729, Tokyo Central, Tokyo 104, Japan. Among the many uses of acrylic fabrics are undergarments, socks, and blankets.

The process is based upon the hydrolyzing of the acrylic knit with hydrazine hydrates to form carboxyl radicals. The hydrolyzed fabric is then treated with silver nitrate which forms a strong acrylic fiber-silver bond. The antibacterial properties of silver are firmly affixed and are not removed with the normal washing recommended for this type of fabric. A summary of the details of the treatment is published in the April 1982 issue of **New Silver Technology.**

SILVER INSTITUTE MEMBER NEWS

Silver Institute Vice President for Europe and Africa, Kenneth R. Barrett, (*pictured at right*), Managing Director, **Britannia Refined Metals Limited,** 98 Cannon Street, London EC4N 6EH, England visited Silver Institute offices in Washington for consultations regarding Institute activities in Europe and Africa. The Silver Institute welcomed to membership **R. Lavin & Sons, Inc., North Chicago Refiners & Smelters Division,** 3426 South Kedzie Avenue, Chicago, Illinois 60623. Metallurgical Engineer A.H. Hesse, will serve as this firm's Official Representative in Institute activities.

APRIL ISSUE OF NEW SILVER TECHNOLOGY

Among the 70 new important developments in silver technology worldwide presented in the April 1982 issue of The Silver Institute publication NEW SILVER TECHNOLOGY are:

- **National Research Development Corporation** in London uses silver in surgical implants to combat bacterial infections.

- **Agency of Industrial Science & Technology** in Tokyo has found that the addition of silver oxide makes hydrogen burners operate at lower temperature, with greater safety and avoids nitrogen-oxide pollution.

- **Mr. Norman L. Weinberg** in New York has patented a new process for enhancing diagnostic radiographs on silver-halide plates, while subjecting the patient to 50% less X-ray radiation.

- **Kyoto University** of Japan uses a silver and platinum-black electrode in an improved battery for storing solar energy.

- **N.V. Philips' Gloeilampenfabrieken** of Holland has developed an improved method for electroforming silver to form molds for audio and video discs.

- **Pilkington Brothers Limited,** Merseyside, England has developed an improved silver-halide photochromic glass that responds extremely rapidly to changes in light intensity.

SOME REVIVAL IN THE MOVEMENT OF SILVER

In 1981, the U.S. and Non-U.S. refiners participating in The Silver Institute statistical services **used in their own plants or shipped to others, refined silver** at an average rate of 32 million troy ounces per month. In January 1982, this rate of disposition by the refiners was only 28 million troy ounces, and in February it dropped to 27.8 million—respectively 87% and 86% of the 1981 rate. In March 1982, however, their disposition rose to 29.1 million troy ounces, or 90% of the 1981 rate.

The refiners' production kept approximate pace with their disposition, and the total stocks of refined silver in their hands remained well under a half month's supply.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	March 1982	Mar 1982	Feb 1982	Jan-Mar 1982	Jan-Mar 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	4,358,521	4.4	3.6	3.9	4.0	3.7
From Coins	3,185	0.0+	0.0	0.0+	0.4	0.1
From Old Scrap (used photo film & other products)	3,772,245	3.8	**3.2	**3.5	5.4	4.7
From New Scrap (in-plant clippings, waste)*	2,136,510	2.1	**1.6	**1.8	2.3	2.3
TOTAL PRODUCTION	10,270,461	10.3	8.4	9.2	12.1	10.9
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,609,915	3.6	2.3	2.8	3.6	3.4
Shipped Out as 999 Silver	5,460,768	5.5	5.3	5.6	7.9	7.5
TOTAL DISPOSITION	9,070,683	9.1	7.5	8.4	11.5	10.9
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	+1,199,778	+1.2	+0.9	+2.6	+1.7	−0.0+
THESE REFINERS' STOCKS AT END OF PERIOD	3,744,635	3.7	2.5	3.7	2.8	1.1

Production and Disposition of **999 Silver** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	March 1982	Mar 1982	Feb #1982	Jan-Mar 1982	Jan-Mar #1981	Full Yr #1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	11,923,016	11.9	12.3	12.4	12.7	12.9
From Coins	730,051	0.7	0.7	0.7	0.9	0.9
From Old Scrap (used photo film & other products)	4,096,321	4.1	5.2	4.5	7.3	6.2
From New Scrap (in-plant clippings, waste)*	2,390,413	2.4	2.5	2.3	1.5	1.1
TOTAL PRODUCTION	19,139,801	19.1	20.6	19.9	22.3	21.1
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,151,971	3.2	4.1	3.7	6.1	5.3
Shipped Out as 999 Silver	16,806,260	16.8	16.2	16.3	16.4	16.1
TOTAL DISPOSITION	19,958,231	20.0	20.3	19.9	22.5	21.3
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	−818,430	−0.8	+0.2	−0.1	−0.7	−2.5
THESE REFINERS' STOCKS AT END OF PERIOD	7,754,882	7.8	8.6	7.8	9.6	7.8

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes. ** **Revised** to include amended reports. # **Revised** to include operations & stocks of additional participants.

THE SILVER INSTITUTE

A WORLDWIDE ASSOCIATION OF MINERS, REFINERS, FABRICATORS AND MANUFACTURERS
INCORPORATED 1971

1001 Connecticut Avenue NW, Washington, D.C. 20036. Tel. (202) 331-1485 and 331-1228

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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XII NUMBER 5 MAY 1982

YOU CAN'T GO WRONG WITH SILVER AWARDS

In 1933, when Kraft Foods established its **Kraft Merit Award system, it created a beautiful and dramatic award by placing a jade stone in a sterling silver ring**—a ring tailored to the specific requirements of Kraft. The Kraft Merit Award ring is awarded to Kraft employees in recognition of unusual initiatives above and beyond normal job responsibilities, according to Richard W. Crawford, Director of Marketing of the company that manufactures this award, **Balfour**, 25 County Street, Attleboro, Massachusetts 02703. Because of its popularity and success, the Kraft Merit Award system survives today after nearly 50 years, and more than 3,000 Kraft employees have won the right to wear these symbolic sterling awards.

This year, **Carrier Corporation is using pure silver to help celebrate the 25th anniversary of its original Weathermaker heat pump series and as a sales incentive.** Carrier Corporation employed **The Metal Arts Company,** 230 Park Avenue, New York, New York 10017 to create and manufacture the one troy ounce pure silver "coins", *shown above, right*, which are being successfully used as premium awards in its Silver Anniversary heat pump promotion program for all commercial heat pumps sold during 1982. The pure silver coin-like pieces show the Carrier oval logo on one side, and an American flag with the words, "SAVE AMERICA'S ENERGY—INVEST IN A HEAT PUMP", on the other side.

Silver, in the form of one troy ounce pure silver medallions created by The Metal Arts Company, is being used today to help Pocatello, Idaho celebrate its centennial, and to commemorate the sesquicentennial of Utica, New York. These medallions are sold to the public by local banks. And then there is "Sunshine", a pure silver bullion "coin", also designed and minted by The Metal Arts Company, using American silver from the Idaho silver mine of **Sunshine Mining Company** and featuring an American eagle on one side. **"Sunshine" bullion "coins" and other coin-like bullion pieces are very popular as employee incentive awards and as sales promotional premiums.** Additional information may be obtained from **Sunshine Bullion**, 229 East 49th Street, Suite One, New York, New York 10017.

Other successful awards programs have been based on the use of small silver bars, produced by prestigious firms such as **Johnson Matthey Ltd.**, 110 Industry Street, Toronto, Ontario M6M 4M1, Canada and **Engelhard Corporation**, 70 Wood Avenue South, Iselin, New Jersey 08830, as premiums in a wide variety of sales promotion efforts. **And silver is also used as a supreme corporate recognition award**, such as the beautiful sterling silver Retirement Bowl given to employees by Engelhard, shown at left, and the famous President Award of the John Hancock Insurance Company, consisting of a heavy hand hammered Balfour solid sterling silver bowl, 22 inches in diameter, mounted on several 4 feet high sterling silver columns. **It's true, you can't go wrong with silver awards!**

SILVER IN GLASS MAKES RAINBOW OF COLORS PERMANENT

A new process for imparting spectacular colored images in glass has been developed by George A. Luers, **Corning Glass Works**, Corning, N.Y. 14830. In this process, variations of intensity of exposure of silver-containing glass to ultraviolet radiation result in colors from pale yellow through brilliant green, blue, purple, red, and orange. In addition, unwanted ultraviolet rays can be screened

out. The process for making these glasses is summarized on page 26 of the April 1982 issue of New Silver Technology.

Silver halides used in the photographic process have long represented the largest industrial use of silver. The discovery that silver halide also imparts unique properties to glass was announced by the Corning Glass Works in 1946. This was the photochromic glass which has the remarkable property of darkening upon exposure to light, and brightening when the light is removed. It was during the development of these glasses that the color-giving properties of silver halide were discovered. The first experimentation was based on the *length of time* of exposure to ultraviolet light; the present work is based on the *intensity* of that radiation.

The uses of these colorful glasses include such applications as advertising signs, floral designs for glass walls in hotel foyers, and decorative glasses. Their absorption of ultraviolet rays makes them useful for protective eyeglasses for those who have lost their eyes' natural crystalline lenses by cataract operations. The glass serves instead of the crystalline lens to protect the eye from the harmful effects of ultraviolet light. When the polychromatic glass is extruded, a polarizing effect can be induced which is useful for prescription eyeglasses.

The new glass is also useful as a recording medium. Corning researchers have found that a krypton laser can instantly record information as a pattern of dots in the silver-containing glass without processing of any kind, which can be immediately read, erased and re-recorded at will.

Research into the applications of the earlier photochromic glasses that darken with light, continues. **Pilkington Brothers Limited,** St. Helens, WA10 3TT, England, has developed formulations that respond so extremely rapidly to sunlight and dark that they may be used in automobile windshields as well as in prescription eyeglasses. The **American Optical Corporation,** 14 Mechanic St., Southbridge, Massachusetts 01550, has developed a way of obtaining a gradient of photochromaticity over a glass sheet such that it can be used to provide a shading effect for automobile windshields. **PPG Industries, Inc.,** 1 Gateway Center, Pittsburgh, Pa. 15222, has shown that silver-containing glasses when bombarded by electrons, can be made into high resolution photomasks which are durable as well as transparent, allowing for easy, precise alignment on a substrate for microelectric circuit manufacture. The Silver Institute's quarterly publication, **New Silver Technology** summarizes further developments of silver-containing glasses in the Federal Republic of Germany, Israel, Japan, Korea, and Romania.

MANY INTERESTING SILVER COINS FOR 1982

Each year the Royal Canadian Mint commemorates a major Canadian historical event or theme with the issuance of a commemorative silver dollar. This year's silver dollar, *shown at left*, with its striking rendition of a bison's skull, the Saskatchewan legislative building in the background, and the words "CANADA . DOLLAR. 1882–1982 . REGINA", commemorates the centennial of the City of Regina and symbolizes an interesting story about the city's history.

According to the Royal Canadian Mint, "Before wheat and before oil, there was the bison. The bison was the Indians' major source of food, clothing and shelter and, to some extent, their utensils and weapons. After the kill, the bones were heaped into a pile that reached 6 feet in height and some 40 feet in diameter. The Indians believed that the passing herds would be attracted to the burial ground of their brothers, thus ensuring an ever plentiful hunt." Thus, the settlement where Regina is located was called, "Pile O'Bones" until 1882 when the Canadian Pacific Railway stretched its iron ribbon into the settlement, and "Pile O'Bones" was renamed Regina in honor of Queen Victoria.

The Regina commemorative dollar is 50% pure silver, measures 36.07 mm in diameter, weight 23.33 grams, and may be obtained for 15 Canadian dollars from the **Royal Canadian Mint,** P. O. Box 457, Station A, Ottawa, Ontario K1N 8V5, Canada.

Other interesting silver coins, scheduled for, or in, the minting process, are: four silver Austrian coins commemorating the 500th anniversary of printing in Austria and other historical themes; an Australian $10 silver coin marking the holding of the XII Commonwealth Games in 1982 in Brisbane, Australia; up to 20 silver coinages from nations such as Argentina, Bolivia, Bulgaria,

People's Republic of China, Chile, Colombia, Costa Rica, Czechoslovakia, Ethiopia, Hungary, Jamaica, Panama, Peru, Portugal, Poland, Sudan and Uruguay which are scheduled to commemorate the holding of the **1982 World Championship of Soccer Games in Spain;** seven 720 fine silver Egyptian coins honoring the Ministry of Industry, International Food Day, the Nationalization of the Suez Canal and other events of historical importance; two 850 fine silver Israel coins honoring Edmund James Rothschild; and the centenary of the death of **Italian patriot, Giuseppe Garibaldi,** 1807–1882 commemorated by a 500-lire silver coin to be minted by San Marino.

Coins issued to commemorate the International Year of the Child, a United Nations Childrens Emergency Fund project, are always popular. The first nation to announce its plans to issue an IYC 10 peso silver coin in 1982 is the Dominican Republic, according to a recent announcement by Carlos Despradel, governor of the Central Bank of the Dominican Republic. The 900 fine silver features a rendering of a boy sketching a house. It will measure 38.61 mm in diameter and will weigh 23.33 grams, while double thick silver piéfort coins will weigh 46.66 grams. This will be the first piéfort coin ever to be issued by the Dominican Republic.

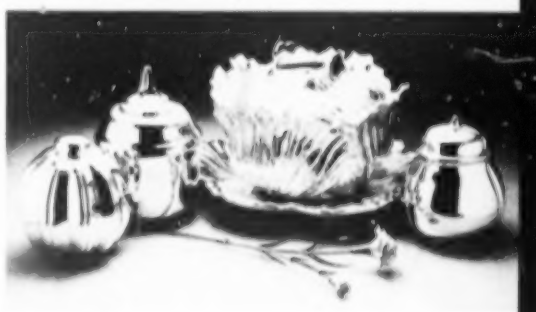
In the United States, preparations continue for the minting of 10,000,000 **George Washington Birthday commemorative** 90% silver coins and additional millions of silver coins to mark the holding of the **23rd Olympic Games** in Los Angeles, California in 1984.

FOR THE JUNE BRIDE—A STERLING TRADITION

The approach of the new spring and summer has witnessed the revival of traditional sterling silver gifts for the June bride. This renewed preference for sterling table settings, trays, plates, tea sets, vases, wine goblets and candlesticks comes as no surprise; for people have long recognized both the usefulness and the lasting beauty of these treasured gifts that serve as permanent reminders of that very special wedding day.

Reflecting the return to this tradition, is the exciting new sterling silver flatware pattern called "American Federal" by **Reed & Barton,** 144 Britannia, Taunton, MA 02780, shown left, highlighting the new product introduction of this spring. Created by designer George Pinheiro, this handsome pattern was inspired by an architectural detail called "dentil moulding" that characterized the buildings of the 1790–1820 Federal Period in America. **Tiffany & Co.,** 5th Avenue & 57th Street, New York, N.Y. 10022 adds a decorative touch in its exclusive collection of sterling silver gourd boxes and its cabbage tureen, shown at right.

The choices of sterling gifts are nearly endless. **Lynn Jewelers Limited,** 1030 17th Street, N.W., Washington, D.C. 20036, offers such easily affordable sterling silver items as a four piece table setting for only $200, a 4½ inch wine goblet for $155, a rich candlestick for $130, a delightful set of four cordials for only $265, and a very special sterling silver jigger with an Eisenhower silver dollar piece adorning the bottom for $75. A sterling silver gift is as lasting and as special as the day it celebrates, and nothing satisfies like the alluring lustre of sterling.



NEW SILVER INSTITUTE MEMBERS WELCOMED

The Silver Institute warmly welcomes to membership **Union Carbide Corporation,** Old Ridgebury Road, Danbury, Connecticut 06817 to be represented in Institute affairs by its Vice President, New Business Development, Metals Division, Mr. Basil T. Hone; **Hudson Wire Company,** 62 Water Street, Ossining, New York 10562 with Mr. D. K. Sanghavi, Corporate Manager of Materials, as its Official Representative; and the **Texas Mint,** 17440 Dallas Parkway, Dallas, Texas 75252 with Miss Gregrie Straughan serving as its Official Representative in Institute matters. **The 149 members of The Silver Institute produce silver and silver products in 25 countries.**

SILVER REFINER'S PROLUCTION AND STOCKS DECREASED

The amount of refined silver produced in April 1982 for its increasing number of uses, was less than for any recent month. As shown below, in April U.S. participants in The Silver Institute statistical series produced 8.9 million troy ounces, and Non-U.S. participants produced 18.1 million troy ounces, to make a total of 27.0 million troy ounces. This was 16% less than their 32.0 million troy ounces monthly average of production in 1981.

In April refiners used or shipped out more refined silver than they produced, reducing their stocks to only 10.5 million troy ounces, equivalent to less than 12 days of production.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	April 1982	Apr 1982	Mar 1982	Jan-Apr 1982	Jan-Apr 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,544,385	3.5	4.4	3.8	3.9	3.7
From Coins	18,013	0.0+	0.0+	0.0+	0.3	0.1
From Old Scrap (used photo film & other products)	3,503,564	3.5	3.8	3.5	5.4	4.7
From New Scrap (in-plant clippings, waste)*	1,789,852	1.8	2.1	1.8	2.4	2.3
TOTAL PRODUCTION	8,855,814	8.9	10.3	9.1	12.0	10.9
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,132,445	3.1	3.6	2.9	3.6	3.4
Shipped Out as 999 Silver	6,158,224	6.2	5.5	5.7	7.9	7.5
TOTAL DISPOSITION	9,290,669	9.3	9.1	8.6	11.4	10.9
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	−434,855	−0.4	+1.2	+2.2	+2.3	−0.0+
THESE REFINERS' STOCKS AT END OF PERIOD	3,309,780	3.3	3.7	3.3	3.4	1.1

Production and Disposition of **999 Silver** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	April 1982	Apr 1982	Mar 1982	Jan-Apr 1982	Jan-Apr #1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	11,765,649	11.8	11.9	12.2	13.1	12.9
From Coins	630,002	0.6	0.7	0.7	0.9	0.9
From Old Scrap (used photo film & other products)	3,434,002	3.4	4.1	4.2	7.3	6.2
From New Scrap (in-plant clippings, waste)*	2,291,015	2.3	2.4	2.3	1.5	1.1
TOTAL PRODUCTION	18,120,668	18.1	19.1	19.5	22.7	21.1
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	2,588,659	2.6	3.2	3.4	6.2	5.3
Shipped Out as 999 Silver	16,093,296	16.1	16.8	16.2	16.2	16.1
TOTAL DISPOSITION	18,681,955	18.7	20.0	19.6	22.4	21.3
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	−561,287	−0.6	−0.8	−0.6	+0.3	−2.5
THESE REFINERS' STOCKS AT END OF PERIOD	7,193,595	7.2	7.8	7.2	10.6	7.8

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes. Revised to include additional refiners.

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INFORMATION ON SILVER FOR INDUSTRY

VOLUME XII NUMBER 6 JUNE 1982

POLAROID PRINTS FROM VIDEO SCREENS

In a comprehensive explanation of the new directions of imaging, delivered at the twelfth Annual Meeting of The Silver Institute held in the Yale Club of New York City on June 25th, Mr. David C. Du Four, Director of North American Industrial Marketing of Polaroid Corporation, said, **"Silver's imaging capacity has never been equaled by any other means—electronic or otherwise—and probably won't in our lifetimes."** Silver, he went on to say, can "do it all." It can detect as little as 4 photons of light and can amplify that incident light by a factor of one billion times. Furthermore, the photographic film can store far more information per unit area than magnetic tape, because silver halide crystals can resolve about twice as well as that of the best computer system.

Mr. D. C. Du Four explains amazing capabilities of the Polaroid Videoprinter Model 4 shown above.

The 1949 invention of instant photography by Dr. Edwin Land made it possible for the photographic image to be available for the record, for diagnosis, or for communication in "real time". This development has caused photography to move subtly away from solely a medium of remembrance, to one that is increasingly used to convey and communicate information. Now a new development by Image Resources Corporation in California, the Videoprinter, uses the Polaroid process to provide **instant color prints, ranging in size from 35 mm on up to 8" × 10", of the most sophisticated of computer color graphics,** thus uniting the silver halide systems to the ever-expanding computer industry. The implications of this process are staggering. Industry forecasts put the number of color images generated by computer graphics systems by 1986 at over 100 million! The reasons for preferring silver imaging of computer graphics are simple: electronic playback systems are hard to carry around to all potential users; not all computer storage information can be played on different systems; premium quality of reproduction requires substantial investments in equipment; but, according to Mr. Du Four, "Perhaps the most compelling reason of all for desiring a paper hard copy, is the very deep-seated psychological need to *own* the information as well as the strong desire to *personalize* it."

Mr. Du Four stated that of all the exciting developments in the application of "real time" photography—from industrial research to medical observations—the one that may have the greatest impact is one that will occur in the home. It is estimated that within the next decade some 8 million homes will have personal computers which will be used for in-home use and for connection to outside information and other consumer oriented systems. **There will be a desire for the user of the home computer to have the ability to record the results of his personal efforts,** or the information that he has purchased from outside sources. Polaroid is seeking to develop an inexpensive system to satisfy that burgeoning need.

All of these developments depend upon the remarkable imaging capacity of silver halide. Any replacement of silver halide by electronic images in the future, observed Mr. Du Four, will be compensated for by the many new scientific, industrial, business, and home consumer applications of silver halide prints that are now emerging.

SILVER INSTITUTE PROGRAM STRENGTHENED

At the Annual Meeting of the Silver Institute, the Institute's President, Alex Schmidt-Fellner of AMAX, Inc. (shown at left with Chairman Bernhard Rohe and Treasurer W. P.

Lohden) told Institute members, "I would like to report to you some of the latest plans of the Institute. Considering current tough times, the Executive Committee decided against any increase in dues or assessments for the time being. Nevertheless, the Committee realizes that **the promotion of silver and silver products, including new uses, is even more important now. Therefore, The Silver Institute will accelerate its efforts in this direction.** Steps are being taken to increase the promotion of silver in coins, to broaden the dissemination of technical information, and to continue work on new uses, such as silver in steel.

"The Institute will continue to provide its excellent statistics and other established services. However, to enable us to intensify real development work, The Silver Institute Letter—published monthly up to now—will be published bimonthly, The Silver Ingot Mark Book will not be annually revised, and some other cuts may be made in order to stay within our budget.

"Mr. Simon D. Strauss has kindly agreed to chair the Nominating Committee, the other members being Frank Curren and Patrick O'Neill. The Executive Committee requests that this committee will make proposals to strengthen and diversify the Executive Committee and the organizational structure. In its decisions, the Executive Committee will consider letters which have been received by the Institute from a number of members. We thank you for these constructive contributions and solicit any comments you may have at all times."

Upper row, l. to r.:
R. L. Davies, Executive Director, The Silver Institute; K. D. Hoffman, Kidd Creek Mines Ltd.; Tatsuo Arima, Mitsubishi Metal Corp.; P. M. Lindstrom, Hecla Mining Co.; J. Jossick and L. Savoie of Connecticut Engineering Associates Corp., which displayed several silver products.

Attending the Annual Meeting.

Lower row:
S. G. Long of American Chemical & Refining Co., Inc.; J. Kratter of Heraeus Midland Processing, Inc.; and Bob Ross of Engelhard Corporation; Carlos Loret de Mola of Cia. Minera Huampar, S.A. with Kodak display; and Marvin K. Kaiser displays Johnson Matthey 999 fine silver bars used in the dividend program of his company, Ranchers Exploration and Development Corp.

SILVER INSTITUTE ELECTS OFFICERS

During the Annual Meeting of The Silver Institute, the membership elected Bernhard Rohe of Mexico's **Industrias Peñoles, S.A.** as Chairman of the Board, and Alex Schmidt-Fellner of **AMAX Inc.** as President. Simon D. Strauss of **ASARCO** was elected Chairman Emeritus.

Also elected were the following Regional Vice Presidents: Kenneth R. Barrett of **Brittania Refined Metals Limited** for Europe and Africa; Francis H. Curren of **Pease & Curren** for the Eastern United States; William A. Griffith of **Hecla Mining Company** for the Western United States; Kenneth A. Laidman of **Engelhard Industries of Canada Limited** for Canada; Enrique Ibarra of **Compañía Real del Monte y Pachuca** for Mexico and Central America; Ernesto Baertl of Minas Arcata S.A. for South America; and Yoshihiro Inai of **Mitsubishi Metal Corporation** for Australia and Asia.

Elected as Treasurer was William P. Lohden of **Callahan Mining Corporation,** and as Executive Director and Secretary, Richard L. Davies.

MANY NEW SILVER PRODUCTS DISPLAYED

New silver products and new silver uses in industry, in the arts, and in the financial community composed the beautiful displays that shone at the Annual Meeting this year. Included in the show-

Winning silver designs

ings were the recently developed silver halide products by **Polaroid Corporation,** 575 Technology Square, Cambridge, MA 02139, including its MP-4 camera which produces instant overhead 8″ × 10″ projector transparencies or color prints from slides and prints; and the brand new pocket-size cameras, developed by **Eastman Kodak,** 343 State St., Rochester, N.Y. 14650. **American Chemical & Refining Co., Inc.,** 36 Sheffield St., Waterbury, CT 06720 displayed silver plating salts along with silver contact strips that are installed in the newest telephones, and lipstick cases silver plated by these salts; while **Connecticut Engineering Associates Corp.,** P.O. Box 656, Newtown, CT 06482 exhibited samples of silver powder used in electronics, a faucet made strong by silver brazing alloy, and the compressor section of a turbine engine constructed with a 56% silver alloy for increased strength and corrosion resistance. Those witnessing the display also saw some of the silver bars paid as dividends by **Ranchers Exploration & Development Corp.** in Albuquerque, New Mexico, produced by **Johnson Matthey Ltd.,** of Toronto, Canada. Finally, the **Sterling Silversmiths Guild of America** presented a stunning display of sterling silver craftsmanship—winners in a nationwide contest of student silversmiths—including a magnificent chalice of curvilinear form, a contemporary interpretation of traditional design by John L. Dillon III of the University of Kansas; and a five piece place setting hand-crafted in graduated wedge design forged by Kerry Harper of Boston University from silver cast ingots—the top prize winners.

SILVER INCENTIVE AWARDS SHOWN AT CONVENTION OF PERSONNEL PROFESSIONALS

Over 3,000 people visited the almost 200 exhibits on display in the Exhibit Hall during the 34th Annual Conference of the **American Society for Personnel Administration** (ASPA), June 22–25, in San Antonio, Texas. One of the exhibits—that of The Silver Institute (shown below)—provided this conference of a record number of personnel professionals with the opportunity of seeing and examining pure silver bars, Sunshine "coins" and beautifully crafted silver medallions to be used as commoratives and incentive awards by corporations and cities.

The Silver Institute's exhibit also provided visiting personnel administrators with brochures, folders, and other information showing why silver should be used as awards for service, sales efforts and safety campaigns. In addition, information on how to get the most out of silver awards was given to interested personnel officers.

Based on interviews with people attending this conference, silver pins and a variety of other jewelry items are frequently used as employment service awards, as are larger silver items such as bowls, trays, and other hollowware. Sterling buckles are much prized as safety awards, while silver trophies are frequently given to winners of company athletic events. Silver bars and very attractive "coins" and medallions are also popular as both incentive awards and for use as contest premiums.

A heavy load of work sessions was interspersed with Mexican dancing exhibitions, award ceremonies and door prize drawings in the Exhibit Hall. Among the door prizes announced were one troy ounce 999 fine silver Sunshine bullion "coins," donated by **Sunshine Bullion,** P.O. Box 1878, Grand Central Post Office, New York, N.Y. 10163, beautiful 999 fine 5 gram silver-bars from **Engelhard Corporation,** 70 Wood Avenue South, Metro Park Plaza, Iselin, New Jersey 08830, and the petite and very popular 999 fine 1 gram silver bars manufactured and donated by **Johnson Matthey Limited,** 110 Industry Street, Toronto, Ontario M6M 4M1, Canada. These firms also provided The Silver Institute with very attractive silver display items as well as brochures. Corporate and municipal medallions of purest silver were loaned to the Institute for display by **The Metal Arts Company,** 230 Park Avenue, New York, N.Y. 10017.

STATISTICS WILL BE PRESENTED BIMONTHLY

In the future, The Silver Institute Letter will be published bimonthly. During the rest of this year, this Letter will be issued in August, October and December and each edition will carry the feature, **Latest Silver Institute Refining Statistics**, presenting exclusive data on the production and disposition of 999 silver by all known refiners in the United States, Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany, as well as by some other refiners in Europe and Asia.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	May 1982	May 1982	Apr 1982	Jan-May 1982	Jan-May 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,891,529	3.9	3.5	3.9	3.8	3.7
From Coins	7,066	0.0+	0.0+	0.0+	0.2	0.1
From Old Scrap (used photo film & other products)	3,889,637	3.9	3.5	3.6	5.3	4.7
From New Scrap (in-plant clippings, waste)*	1,306,571	1.3	1.8	1.7	2.3	2.3
TOTAL PRODUCTION	9,094,803	9.1	8.9	9.1	11.7	10.9
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	2,615,348	2.6	3.1	2.8	3.4	3.4
Shipped Out as 999 Silver	5,143,392	5.1	6.2	5.6	7.9	7.5
TOTAL DISPOSITION	7,758,740	7.8	9.3	8.4	11.3	10.9
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	+1,336,063	+1.3	−0.4	+3.5	+2.0	−0.0+
THESE REFINERS' STOCKS AT END OF PERIOD	4,645,843	4.6	3.3	4.6	3.1	1.1

Production and Disposition of **999 Silver** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	May 1982	May 1982	Apr 1982	Jan-May 1982	Jan-May #1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	11,103,912	11.1	11.8	12.0	12.6	12.9
From Coins	620,000	0.6	0.6	0.7	0.9	0.9
From Old Scrap (used photo film & other products)	4,043,727	4.0	3.4	4.2	7.2	6.2
From New Scrap (in-plant clippings, waste)*	1,581,850	1.6	2.3	2.2	1.3	1.1
TOTAL PRODUCTION	17,349,489	17.3	18.1	19.0	22.0	21.1
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,064,351	3.1	2.6	3.3	6.0	5.3
Shipped Out as 999 Silver	14,372,355	14.4	16.1	15.9	16.1	16.1
TOTAL DISPOSITION	17,436,706	17.4	18.7	19.2	22.1	21.3
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	−87,217	−0.1	−0.6	−0.7	−0.1	−2.5
THESE REFINERS' STOCKS AT END OF PERIOD	7,106,378	7.1	7.2	7.1	10.5	7.8

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes. # Revised to include additional refiners.

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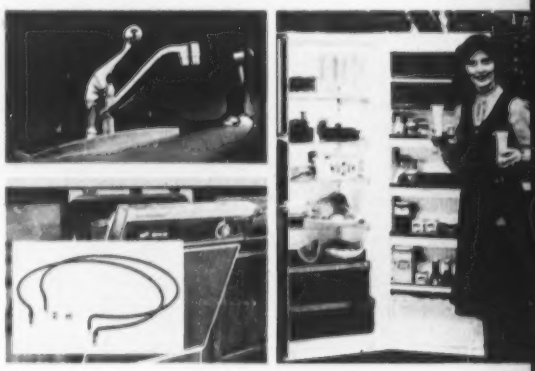
VOLUME XII NUMBER 7 AUGUST 1982

SILVER IN NEW KITCHENS



The family need not worry about the tubing that contains the cooling fluids in the refrigerator-freezer (*popular White-Westinghouse pictured far right*), or the heating coils in the automatic dishwasher (*lower right*), or the components of the single-control faucet for the sink (*upper right*), because their dependable connections are made secure by silver brazes. Silver-bearing brazing metals are among the most widely used for these critical applications where reliable performance is mandatory, because the silver alloys wet almost all metals, are free flowing and ductile, and form strong and perfect seals.

In the dishwasher the heating element is silver brazed to brass threaded connectors which attach the coil. The brazing metal is supplied by **Fusion Incorporated,** 4658 East 355th St., Willoughby, Ohio 44094.

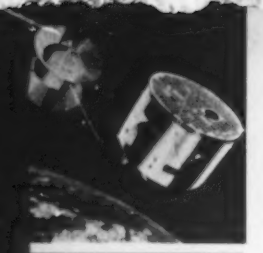
The washerless, single-control kitchen faucet has revolutionized the ease of using water in the kitchen, relying upon silver brazing to substantially increase its durability and performance. Pictured here is Model 400, one of many products of **Delta Faucet Company,** 55 E. 111 St., Indianapolis, Indiana 46280, that rely upon dependable silver-brazed connections.

NEW GEORGE WASHINGTON SILVER COINS NOW BEING MINTED

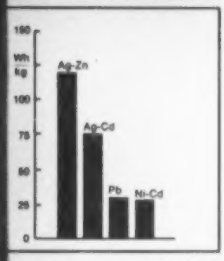
At 9:36 a.m. on July 1, Donna Pope, Director of the U.S. Mint (*pictured at left*) placed a shimmering silver planchet on the coining press at the Denver Mint. The dies came together and seconds later Mrs. Pope was admiring the first United States 900 fine silver coin issue in 18 years and the first such commemorative coin in 30 years! Official production of the George Washington Half Dollar began on July 6, with the striking of Proof coins in San Francisco and Brilliant Uncirculated coins in Denver. The half dollar was designed by Elizabeth Jones, the U.S. Mint's Chief Sculptor and Engraver. The obverse bears an equestrian figure of George Washington surrounded by the inscription, GEORGE WASHINGTON/250TH ANNIVERSARY OF BIRTH • 1982; the reverse is adorned by a rendering of the eastern facade of Mount Vernon, Washington's home on the Potomac River, below which rests the heraldic eagle bearing the banner "E Pluribus Unum". The coins measure 30.61mm in diameter, weigh 12.5 grams, and contain .3617 troy ounces of pure silver. **The silver Proof coins will sell for US$10.50 and the Brilliant Uncirculated variety for US$8.50. Orders should be addressed to the Bureau of the Mint, 55 Mint St., San Francisco, CA. 94175.** The beautifully designed and carefully struck 90% pure silver coins are being applauded by the numismatic and investment communities, and by The Silver Institute, which continues to provide technical information on the advantages to governments and people of face value coinage with a high silver content.

EXPANDING USE OF SILVER BATTERIES

Silver-zinc batteries, due to their high current densities, have proved to be indispensable for land, water, air, and space vehicles where the vehicle must carry its own power source on board. The steadily expanding markets for silver-zinc batteries include aircraft and helicopters, underwater research devices and navigational bouys, portable floodlights and emergency power supply for data



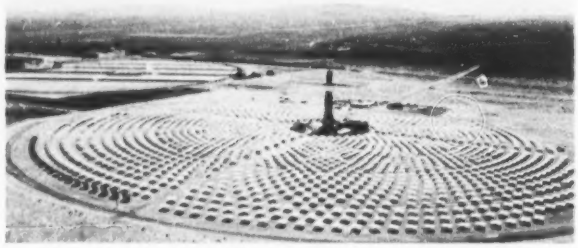
processing machines, portable transmitters and receivers, electric vehicles, cameras, timepieces, and remote-controlled hobby models. Silver batteries made by **Silberkraft-Leichtakkumulatoren GmbH,** D-4100 Duisburg 1, P.O.B. 100703, West Germany, were installed on board the West German scientific satellites Aeros and Helios, *as photographed at left.*



The silver oxide-zinc lightweight accumulator results in an alkaline battery of very high constant discharge voltages of approximately 1.8 and 1.5 volts per cell, and according to the size and construction, a storable energy in the range of 70 to 120 watt-hours per kilogram, which is considerably above the values of other battery systems (*see chart on left*).

Silberkraft continues to conduct research on improving the efficiency of the silver battery. Primary battery systems using silver chloride-zinc, and silver oxide-cadmium are being tested and evaluated for further important applications.

SILVER MIRRORS PUT SOLAR ENERGY INTO CALIFORNIA POWER GRID



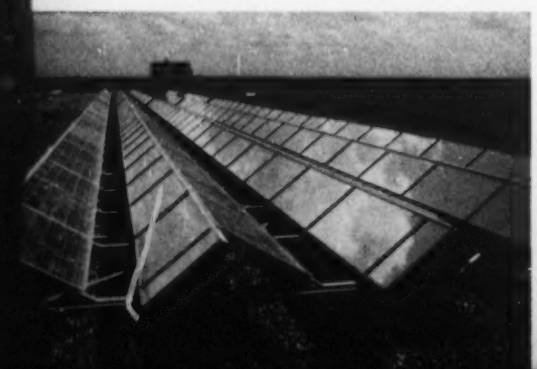
Solar I, the central solar receiver plant pictured on the right, is showing that solar energy, concentrated by silver mirrors, can be efficiently made into electric power on a commercial scale. Operation of the plant started in April when the 3-megawatt trial period began. The power output is being gradually increased until the full 10-megawatt capacity is reached in November. The plant is located in the middle of the Mojave Desert at the Southern California Edison Cool Water Generating Station in Daggett, California, an area of sun-filled days.

At present, Solar I is the largest solar plant in the world. The McDonnell Douglas Astronautics Co., Huntington Beach, California, engineered the plant. The Martin Marietta Corporation, Denver, Colorado, produced the 1,808 heliostats with nearly a million square feet of silver-backed glass mirror surface that make up the reflector field seen in the photo. Each silvered heliostat is computer driven to reflect the sun's thermal energy directly on the 24, 3 × 45 foot heat absorbing panels located on the receiving tower. Each panel contains 70 nickel alloy tubes which absorb the solar energy, and superheat steam to 950°F at a pressure of 1,460 pounds per square inch, to drive the turbines, and generate electricity for Southern California homes.

The Southern California Edison Co. is now inviting private industries to participate directly with the utility in a silvered mirror solar power plant 10 times larger. Dubbed "Solar 100", the 100 megawatt facility is to be located near Solar I and to be operational within the next six years, with consideration of another large silvered mirror power plant in the region by 1990.

SILVER BACKED CELLS COMBINED WITH SILVER REFLECTORS PROVIDE POWER FOR OKLAHOMA CENTER

A series of 108,864 silver-backed silicon solar cells with silver connections, mounted on 1,512 PowerLine panels, manufactured by the **Solarex Corporation,** 1335 Piccard Drive, Rockville, Maryland, 20850, will supply a peak output of 105 kilowatts. When a silvered glass mirror is included opposite each panel, additional solar radiation is reflected onto the cells, and the power output is increased by a third, to 135 kilowatts. This novel "double silver" combination (*shown in photo at left*) is installed on the roof of the Oklahoma Center for Science and Arts in Oklahoma City. It provides the full electric power requirements of the Center during clear days, with utility power available as a supplement at other times.



The solar power installation was designed and put into operation by **Science Applications, Inc.** (SAI), 1710 Goodridge Drive, McLean, Va. 22102. It was financed by the U.S. Department of Energy to demonstrate the feasibility of using such a combination for commercial, industrial, and institutional applications.

SILVER FOR BEAUTY AND SECURITY

Many of the 340 million daughters of India wear abundant sparkling silver jewelry, not only enhancing their beauty, but providing them with financial security. In the Hindu tradition it is what a woman can wear that is recognized as her own property under her own control. So myriads of stunning silver bracelets, necklaces, earrings—coiffure decorations, like that in the photo at right—and other valuable silver ornaments, are sought after, given and cherished by the little girls, the brides, and the matrons of India. And the appreciation for beautiful silver jewelry is increasingly reflected in the rest of the world.

Photo by AIR-INDIA

AMAZING NEW SILVER TECHNOLOGY

Members of The Silver Institute and annual subscribers to the quarterly publication, NEW SILVER TECHNOLOGY, are kept abreast of worldwide benefits from silver. Among the Summaries in the July issue just published are descriptions of the following.

- From Germany (page 4), silver-containing antiseptic protective coatings and coverings to reduce transmission of disease, for door knobs, handrails, and toilet seats.
- From the United States (page 6), new silver burn treating composition to protect against infection throughout the healing process.
- From England (page 7), control of infection in citrus trees by silver anodes.
- From the United States (page 16), making benzene for chemical manufacture, and high octane fuel with a silver-containing catalyst.
- From Japan (page 29), embedding silver wire in solid propellant for faster rocket motors.
- From Israel (page 31), optical fibers made of silver chloride instead of glass for improved infrared transmission in surgery and many other applications.
- From India (page 46), cost-saving incorporation of silver in silicon cells to convert sunlight into electric power.
- From Canada (page 47), non-polluting processes for producing pure silver powder from silver-containing ores.

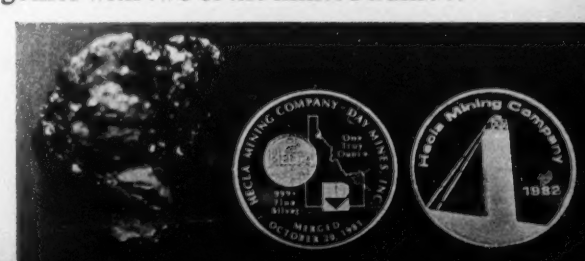
Details of these and other new silver developments may be obtained by sending check for US$30 for the four 1982 quarterly issues of NEW SILVER TECHNOLOGY, to The Silver Institute, 1001 Connecticut Ave., N.W., Washington, D.C. 20036.

NEW U.S. SILVER COINAGE DEVELOPMENTS

The U.S. Government has just authorized the minting of 50 million Silver Dollars to commemorate the 1984 Olympic Games in Los Angeles. Also, Senator James A. McClure and Congressman Larry E. Craig have introduced Bills directing that any of the 105 million troy ounces of silver in the U.S. strategic stockpile which may be released, shall be issued as new silver coinage.

SILVER FROM MINES TO MEDALLIONS

Silver bearing rock is mined a mile under the surface of Idaho, and converted into fine silver for thousands of products used in industries and homes. The photo below shows a piece of this ore produced in Hecla Mining Company's Lucky Friday Mine; together with two of the limited number of one troy ounce 999+ fine silver Proof medallions made from the ore. These beautiful silver pieces are individually packed in clear plastic capsules to protect the sparkling allure of the silver, and are available directly from Hecla Mining Company, Wallace, Idaho 83873, for US$14 each plus 50¢ for postage and handling.



JAPANESE MANUFACTURERS USE MORE SILVER

Figures just analyzed from the Japanese Japan Mining Industry Association show that industries in Japan used 999+ silver at the rate of 4,981,892 troy ounces per month in the first 4 months of 1982, and that this was an 8% increase over the 4,612,006 troy ounces per month used in the same period of 1981. The end-use monthly consumption of 999+ silver in the 1982 period, together with the percent change from the same period in 1981, were as follows: Photo-products, 2,795,105 tr. ozs. (+7%); Solders, 599,911 tr. ozs. (+21%); Silver nitrate, 403,844 tr. ozs. (—4%); Electric & Electronic, 331,700 tr. ozs. (+37%); Diverse applications, 276, 980 tr. ozs. (—9%); Brazing, 274,971 tr. ozs. (+13%); Plating, 193,246 tr. ozs. (—3%); Silverware, 106,135 tr. ozs. (+19%).

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver** by All Known Refiners in the United States

	TROY OUNCES		MILLION TROY OUNCES		
	July 1982	June 1982	Jan-July 1982	Jan-July 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE			*MONTHLY RATE*		
From Primary (ores & concentrates)	3,488,117	3,631,462	3.8	3.8	3.7
From Coins	17,691	0	0.0+	0.2	0.1
From Old Scrap (used photo film & other products)	2,971,763	3,336,987	3.5	5.1	4.7
From New Scrap (in-plant clippings, waste)*	1,303,338	1,871,756	1.7	2.4	2.3
TOTAL PRODUCTION	7,780,909	8,840,205	8.9	11.5	10.9
DISPOSITION BY THESE REFINERS					
Converted in Plant (consumed in fabricating, etc.)	2,329,625	2,844,983	2.7	3.4	3.4
Shipped Out as 999 Silver	6,165,009	5,359,984	5.7	7.9	7.5
TOTAL DISPOSITION	8,494,634	8,204,967	8.4	11.3	10.9
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*		
STOCKS (Production Minus Disposition)	−713,725	+635,238	+3.5	+1.2	−0.0+
THESE REFINERS' STOCKS AT END OF PERIOD	4,567,356	5,281,081	4.6	2.3	1.1

Production and Disposition of **999 Silver** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany; and some other Refiners in Europe and Asia.

	TROY OUNCES		MILLION TROY OUNCES		
	July 1982	June 1982	Jan-July 1982	Jan-July 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE			*MONTHLY RATE*		
From Primary (ores & concentrates)	11,773,068	9,379,035	11.6	12.7	12.9
From Coins	530,124	530,000	0.6	0.8	0.9
From Old Scrap (used photo film & other products)	3,569,610	3,072,205	3.9	6.6	6.2
From New Scrap (in-plant clippings, waste)*	1,875,857	1,437,529	2.0	1.2	1.1
TOTAL PRODUCTION	17,748,659	14,418,769	18.2	21.4	21.1
DISPOSITION BY THESE REFINERS					
Converted in Plant (consumed in fabricating, etc.)	3,138,811	2,558,755	3.2	5.5	5.3
Shipped Out as 999 Silver	14,360,074	13,630,997	15.3	16.0	16.1
TOTAL DISPOSITION	17,498,885	16,189,752	18.5	21.5	21.3
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*		
STOCKS (Production Minus Disposition)	+249,774	−1,770,983	−2.3	−0.1	−2.5
THESE REFINERS' STOCKS AT END OF PERIOD	5,585,169	5,335,395	5.6	10.2	7.8

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes.

THE SILVER INSTITUTE
A WORLDWIDE ASSOCIATION OF MINERS, REFINERS, FABRICATORS AND MANUFACTURERS
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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XII NUMBER 8 OCTOBER 1982

SILVER COINS REFLECT THE WORLD AND ITS VALUES

While a beautiful Austrian silver 500 Schilling coin, pictured below, pays tribute to religious tolerance, another silver coin helps celebrate the Jewish festivities of Hanukka by portraying a lamp from Poland, and a 50 Piso silver coin of the Philippines depicts Pope John Paul II to commemorate his visit to the Far East, while still other silver coins issued in 1981 showed the holiest shrines of the Islamic world. One thing that all of these coins have in common is the fact that each coinage is described in detail in The Silver Institute's annual publication, **Modern Silver Coinage—1981.**

Heinrich G. Schneider, of the International Monetary Fund Board of Executive Directors looking at Modern Silver Coinage—1981's descriptions of silver coinages issued by three countries he represents in the IMF—Austria, Hungary, and Turkey.

Based on information obtained from the central banks, ministries of finance and mints throughout the world, Modern Silver Coinage—1981 reports that 82 countries issued 258 coinages in 1981 compared with 247 coinages in 1980, and used 5,904,842 troy ounces of pure silver in the minting of these coinages. Eighteen of the issuing nations did not produce silver coins in 1981 and 17 countries increased their production of silver coins during 1981. According to Modern Silver Coinage—1981, the nations using the most silver in the minting of silver coins were, in order of troy ounces used, Austria, Greece, Isle of Man, Italy, Canada, Great Britain, Taiwan, Finland, the United States of America, and San Marino.

Among the 258 silver coinages described in Modern Silver Coinage—1981, was the first coin to depict a motorcycle race, issued by the Isle of Man which struck 20 commemorative silver coinages during 1981! And for coin collectors who collect coins showing the world's flora and fauna, beautiful coins were issued showing Orange Blossom flowers, orchids, hummingbirds, horses, roosters, eagles, Royal Terns, crocodiles, Tiger sharks, Swordfish, lions, cows, a hog, and even a Phoenix bird. But to find out what country issued these coins, the percentage of pure silver in each coin, the number issued, a detailed description of all silver coins issued in 1981—the answers are to be found in only one publication, Modern Silver Coinage—1981.

Silver coins were also struck to help celebrate the brilliant social event of 1981, the Royal Wedding of England's Prince Charles and Lady Diana Spencer. Nations issued 23 coinages—with a total of 812,877 silver coins—honoring the royal couple. Among these silver coinages is a Jamaican $25 coin which is the largest and heaviest silver coin issued. This spectacular coin weighs more than a quarter pound (136.08 grams), and has a diameter of 63 millimeters, according to information contained in **Modern Silver Coinage—1981.** Copies of this unique reference book may be obtained for US$10 each, including postage, from The Silver Institute, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036.

SENATOR McCLURE SPEAKS AT INSTITUTE MEETING

U.S. Senator, James A. McClure and Silver Institute President, W. A. Griffith, Hecla Mining Co.

On October 12th, at the time of the American Mining Congress in Las Vegas, Nevada, a well attended and enthusiastic meeting of the Board of Directors of The Silver Institute and officials of member companies elected as Chairman of the Board, Alex Schmidt-Fellner of AMAX Inc. who had been President; as the new President, William A. Griffith of Hecla Mining Company; and as Vice President for

Western U.S., Justin L. Rice of Coeur d'Alene Mines Corporation. Great appreciation was expressed for the outstanding service of Bernhard Rohe formerly of Peñoles, the retiring Chairman of the Board and of the Finance Committee. A.M.B. Hart of Johnson Matthey Ltd. was elected as a member of the Executive Committee and as Chairman of the Finance Committee.

In presenting to the meeting the newly published Modern Silver Coinage—1981, Institute Executive Director Richard L. Davies spoke of the creative and constructive work of U.S. Senator James A. McClure in connection with new U.S. silver coin issues. Senator McClure described to the meeting the great benefits which the issuance of silver coins bring to the government and to all who obtain the silver coins.

Seiichi Ohtsuki of Mitsubishi Metal Corporation brought greetings from his Chairman, Yoshihiro Inai who is Silver Institute Vice President for Australia and Asia. The meeting received with keen interest reports on new developments affecting silver, in Mexico by Bernhard Rohe, and in Bolivia by Bertram Hamilton of Empresa Minera Unificada S.A.

Above, left to right, attending the Institute Board meeting, A.M.B. Hart of Johnson Matthey Ltd., Justin L. Rice, Coeur d'Alene Mines Corp. and William P. Lohden of Callahan Mining. Below, l. to r., Bertram Hamilton, Empresa Minera Unificada S.A. of Bolivia; Takashi Tanaka of Tanaka Kikinzoku Kogyo K.K. of Japan; and John T. Humphrey of Minera Frisco of Mexico.

THERE'S A SILVER GIFT FOR EVERY POCKETBOOK

L'Art de la Table is a new collection of luxurious sterling silver and silver rimmed crystal accessories for dining. Designed and executed in the workshops of Cartier-Paris, the collection consists of nineteen classically styled pieces, some of which are pictured below right. Each silver piece bears six renowned silver hallmarks including the well known "925" indicating the sterling fineness; the head of Minerva, a French state hallmark in effect since 1838; the head of Mercury which has been struck on all sterling silver pieces manufactured in France for export since 1838; and the famous Cartier-Paris signature.

The Cartier collection which would grace the most elegant Christmas dinner table contains sterling silver pieces ranging from $120 for a set of two silver card holders to $500 for a silver Champagne glass, according to Cartier at Fifth Avenue and 52nd Street, New York, N.Y. 10022. And for the formal Christmas tea or coffee, there is the beautiful hand-crafted five-piece octagonal sterling silver service pictured below left, consisting of a coffee pot, teapot, waste bowl, creamer, and sugar bowl—priced at $17,000 at Tiffany & Co., Fifth Avenue and 57th Street, New York, N.Y. 10022.

If gifts in the above price range don't fit within one's Christmas gift budget, both Cartier and Tiffany's offer a wide selection of sterling silver products such as Tiffany's apple-shaped bookmark for only $15 and Cartier's horseshoe key ring for $20. Or perhaps a "Star Bell" (pictured above on the next page) in sterling silver, that gently rings as one wears it, could liven up the Christmas celebration. This novel bell is produced by Terrymayer, 165 East 35th Street, New York, N.Y. 10016 and is sold by Tiffany's New York and Beverly Hills stores.

Other fine stores also carry numerous gift possibilities in sterling silver for each member of the family. For the baby, there could be a "keepsake rattle" priced at $12 or a feeding spoon at $15. And for the ladies of the house, there are beautiful bracelets (from $4 to $33), earrings ($6.50 to $16) and charm bracelets and charms, yes, thousands of charms priced from $1.97 for a sterling "Snowflake" to $3.47 for a "90% Angel." One jewelry manufacturing company alone lists more than 7,000 different sterling silver charms in its catalog.

This company, Rembrandt Jewelry Manufacturing, Ltd., 1100 Birchmount Road, Scarborough, Ontario, Canada M1K 5E5, produces charms for practically every occasion and every topic, from flowers to animals to sailboats to religion to signs of the zodiac to marriage to birthdays—and on and on. All make wonderful gifts. For men, there are many handsome sterling silver gifts, including heavy silver I.D. bracelets for around $80, or a knife for $24. At Tiffany's, the man can also choose from an impressive selection of sterling silver money clips, tie clasps, belt buckles, "Do it to-day" clips, magnifiers, and letter openers.

Last, but certainly not least, are the small ingots of pure silver that are so popular today as gifts in the form of pendants, rings, tie clasps, and other decorative jewelry items. Pure silver ingots can be obtained from firms such as Johnson Matthey, 110 Industry Street, Toronto, Ontario M6M 4M1 Canada or 4 Malin Road, Malvern, Pennsylvania 19355; and Engelhard, 70 Wood Avenue South, Metro Park Plaza, Iselin, New Jersey 08830 or 100 Engelhard Drive, Aurora, Ontario L4G 3N1, Canada.

WORLDWIDE RESEARCHERS FIND MORE SILVER USES

The October 1982 quarterly issue of **New Silver Technology** presents Summaries of the most recent 70, of the more than 2,500 valuable silver developments which this publication has reported over the last nine years. A **New Silver Technology** annual subscription may be obtained by sending US$30 to The Silver Institute, 1001 Connecticut Ave., N.W., Washington, D.C. 20036.

The developments reported in the October 1982 issue were from many countries. Here are some examples.

USA

Corning Glass Works now make a glass-silver halide laminate which forms a permanent positive image, developed simply by brief light and heat treatment. (page 43)

Bell Telephone Laboratories finds that an alloy of 40% silver and 60% palladium with a surface implantation of boron ions gives greatly improved performance for sliding connectors in telecommunications equipment. (page 40)

JAPAN

National Resources Institute for Metals in Tokyo uses silver in new niobium-tin wire superconductors for nuclear fusion reactors and economical power transmission. (page 30)

Nippon Electric Company, Ltd. can now mass-produce an increasing volume of computer chips by using a silver electroconductive paste baked on both sides of ceramic pieces. (page 37)

POLAND

A beautiful alloy for jewelry or tableware, more than twice as hard as those previously used, has been developed by *Zaklad Podstaw Metalurgii*, containing 85% silver, 14% copper and 1% titanium. (page 57)

Technischen Universitat Lodz has developed improved contacts for rapidly operating automatic welding machines, using a fibrous alloy of 90% silver and 10% nickel. (page 39)

GERMAN FEDERAL REPUBLIC

Reliable welds between aluminum and stainless steel, by prior electrodeposition of silver, are now being made by *Aluminium Verlag GmbH.* (page 18)

CANADA

Research Council of Alberta has found that seeding clouds with silver iodide produced 20 times as much rain as an alternative method of seeding with carbon dioxide pellets. (page 59)

FRANCE

Improved wave guides for optical transmission of information are made by *Institut National Polytechnique de Grenoble* by immersing the glass parts into molten silver and potassium nitrates. (page 25)

SOUTH AFRICA

De Beers Industrial Diamond Division, Pty., Ltd. uses 14% silver, 51% copper, and 35% zinc as a bonding agent with diamond abrasives for improved rock drilling. (page 17)

SILVER SUPPLIES DECREASE

The production of 999 refined silver by the more than 50 refiners in 14 countries which send their individual confidential reports on their operations to The Silver Institute, was at the average rate of 26.5 million troy ounces per month in the period from January through September of 1982. This was 18% less than the 32.3 million troy ounces per month the same period last year. Production in August and September 1982 was respectively 24.0 and 24.9 million troy ounces.

Stocks of 999 silver in the hands of these refiners dropped from 12.3 to 10.8 million troy ounces, from the end of September 1981 to the end of September 1982, representing less than two weeks of production.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver** by All Known Refiners in the United States

	TROY OUNCES		MILLION TROY OUNCES		
	September 1982	August 1982	Jan-Sep 1982	Jan-Sep 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE			*MONTHLY RATE*		
From Primary (ores & concentrates)	3,285,768	3,057,982	3.6	3.9	3.7
From Coins	0	17,691	0.0+	0.2	0.1
From Old Scrap (used photo film & other products)	2,978,628	3,663,634	3.4	4.9	4.7
From New Scrap (in-plant clippings, waste)*	1,607,611	1,779,031	1.7	2.3	2.3
TOTAL PRODUCTION	7,872,007	8,518,338	8.7	11.2	10.9
DISPOSITION BY THESE REFINERS					
Converted in Plant (consumed in fabricating, etc.)	2,913,799	2,915,525	2.8	3.3	3.4
Shipped Out as 999 Silver	5,073,231	5,994,698	5.6	7.8	7.5
TOTAL DISPOSITION	7,987,030	8,910,223	8.4	11.1	10.9
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*		
STOCKS (Production Minus Disposition)	−115,023	−391,885	+3.0	+1.5	−0.0+
THESE REFINERS' STOCKS AT END OF PERIOD	4,060,448	4,175,471	4.1	2.6	1.1

Production and Disposition of **999 Silver** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa, Sweden, and West Germany; and some other Refiners in Europe and Asia.

	TROY OUNCES		MILLION TROY OUNCES		
	September 1982	August 1982	Jan-Sep 1982	Jan-Sep # 1981	Full Yr 1981
THESE REFINERS' PRODUCTION, BY SOURCE			*MONTHLY RATE*		
From Primary (ores & concentrates)	9,706,116	9,406,696	11.1	12.7	12.9
From Coins	435,004	435,045	0.6	0.8	0.9
From Old Scrap (used photo film & other products)	4,962,590	3,894,114	4.0	6.4	6.2
From New Scrap (in-plant clippings, waste)*	1,923,062	1,761,375	2.0	1.2	1.1
TOTAL PRODUCTION	17,026,772	15,497,230	17.8	21.1	21.1
DISPOSITION BY THESE REFINERS					
Converted in Plant (consumed in fabricating, etc.)	3,744,917	2,924,438	3.2	5.4	5.3
Shipped Out as 999 Silver	13,323,021	11,437,503	14.7	16.0	16.1
TOTAL DISPOSITION	17,067,938	14,361,941	17.9	21.4	21.3
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*		
STOCKS (Production Minus Disposition)	−41,166	+1,135,289	−1.2	−0.3	−2.5
THESE REFINERS' STOCKS AT END OF PERIOD	6,679,292	6,720,458	6.7	9.7	7.8

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes. # Revised to include additional refiners.

THE SILVER INSTITUTE

A WORLDWIDE ASSOCIATION OF MINERS, REFINERS, FABRICATORS AND MANUFACTURERS

INCORPORATED 1971

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